



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/945,454	08/31/2001	Steven Verhaverbeke	004936 USA/ETCH/METAL	3536

32588 7590 12/05/2002

APPLIED MATERIALS, INC.
2881 SCOTT BLVD. M/S 2061
SANTA CLARA, CA 95050

EXAMINER

MOORE, KARLA A

ART UNIT	PAPER NUMBER
----------	--------------

1763

DATE MAILED: 12/05/2002

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/945,454

Applicant(s)

VERHAVERBEKE ET AL.

Examiner

Karla Moore

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/03/02.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-79 is/are pending in the application.
- 4a) Of the above claim(s) 1-10, 17, 26-43 and 52-79 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-16, 18-25 and 44-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-5, 11-16, 18-25 and 44-51 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s): _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group I, claims 1-5, 11-16, 18-25 and 44-51, in Paper No. 6 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Examiner also notes that claim 17 was inadvertently grouped with the elected apparatus claims in the above election restriction. As claim 17 is a method claim, it has been regrouped and withdrawn along with the similar method claims which were non-elected.
3. With respect to the remaining elected claims, restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claim 1-5, drawn to a single wafer wet/dry cleaning apparatus, classified in class 156, subclass 345.31.
 - II. Claims 11-16, 18-25 and 44-51, drawn to an apparatus for atmospheric and sub-atmospheric processing of a wafer, classified in class 156, subclass 345.32.

The inventions are distinct, each from the other because of the following reasons:

4. Inventions II and I are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the combination does not require a first single wafer ashing module directly coupled to a transfer chamber. The subcombination has separate utility such as a stand-alone single wafer wet/dry cleaning apparatus, wherein only a single transfer chamber (either at atmospheric or sub-atmospheric pressure) is a part of the apparatus.
5. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

Art Unit: 1763

6. During a telephone conversation with Mr. Michael Berndicou on November 19, 2002 a provisional election was made with traverse to prosecute the invention of Group II, claims 11-16, 18-25 and 44-51. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-5 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

7. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Specification

8. A new abstract is requested as the current one does not read on the elected invention.

Claim Objections

9. Claim 47 is objected to because of the following informalities: the claim recites "the method of claim 45, ..." This appears to be a typing a mistake as claim 45 and 47 both appear to be apparatus claims. Appropriate correction is required.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claim 15 recites the limitation "said first and second load locks". There is insufficient antecedent basis for this limitation in the claim.

12. Claim 22 recites the limitation "a CD measurement tool coupled to said sub-atmospheric chamber". There is insufficient antecedent basis for this limitation in the claim. Both the figures and the

Art Unit: 1763

specification disclose the CD measurement tool coupled to the atmospheric chamber. The claims were treated as the apparatus is disclosed in the specification and figures.

13. Claim 48 recites the limitation "a second single wafer thermal process tool". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

14. Claims 11-16, 18, 20, 22-23, 44 and 48-49 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,769,952 to Komino.

15. With respect to claims 11, Komino discloses an apparatus for atmospheric and sub-atmospheric processing of a wafer in Figure 1, comprising: an atmospheric transfer chamber (20) having a first wafer handler (22) contained therein; a sub-atmospheric transfer chamber (14) having a second wafer handler (16) contained therein; a first load lock chamber (130A) coupled to said sub-atmospheric chamber and to said atmospheric chamber; a first atmospheric processing module (18A) coupled to said atmospheric transfer chamber; and a first sub-atmospheric processing module (10A) coupled to said sub-atmospheric transfer chamber.

Art Unit: 1763

16. With respect to claims 12 and 13, Komino teaches that the atmospheric processing modules may be used for wet cleaning (column 6, rows 7-15) and that the sub-atmospheric processing modules (10 A-C) may be used for CVD, etching, or oxidation. Komino additionally teaches that the invention is not limited to these particular processing techniques for either the atmospheric or sub-atmospheric processing modules (column 6, rows 23-35 and column 11, rows 26-34).

17. Further, the courts have ruled that a claiming a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ 2d 1647 (Bd. Pat. App. & Inter. 1987).

18. With respect to claims 14 and 15, said apparatus further comprises a second load lock (130B) coupled between said atmospheric transfer chamber and said sub-atmospheric chamber. Both the first and second load lock are single wafer load locks (column 7, rows 10-18).

19. With respect to claim 16, a wafer cassette (24 A and 24 B) is coupled to said atmospheric transfer chamber for providing wafers to be loaded into said atmospheric chamber.

20. With respect to claims 18, 20 and 22-23, as noted above any number of etch modules or ashing modules (in any of chambers 10 A-C) may be coupled to said sub-atmospheric chamber (column 5, rows 48-59).

21. With respect to claim 44, in the invention of Komino as noted above a wet cleaning module (in any of chamber 18 A-C) may be coupled to said atmospheric transfer chamber. Also, a single wafer thermal process module (in any of chambers 10 A-C) may be coupled to said sub-atmospheric transfer chamber (column 7, rows 25-28).

22. While Komino does not teach deposition of polysilicon in any of the sub-atmospheric chambers they would be capable of depositing polysilicon and this seen as an intended use similar to the limitations of claims 12 and 13 (see paragraphs 15 and 16 above).

23. With respect to claims 48 and 49, any number of the modules coupled to the sub-atmospheric transfer chamber may be thermal process modules. As noted above, first and second load locks are coupled between the sub-atmospheric transfer chamber and atmospheric transfer chamber.

24. Claims 11-16, 18-25 and 44-51 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Publication No. 2002/0155629 to Fairbairn et al.

25. Fairbairn et al. disclose an apparatus for etching and cleaning a wafer in Figures 9 A-C, comprising: an atmospheric transfer chamber (905b); having a first wafer handler (907) contained therein; a sub-atmospheric transfer chamber (901) having a second wafer handler (904) contained therein; first and second single wafer load locks (903) between the transfer chambers; a single wafer wet cleaning module (911) coupled directly to said atmospheric chamber; an etch module (902) and first and second ashing modules (909) coupled to said sub-atmospheric transfer chamber; a wafer cassette (908) coupled to said atmospheric transfer chamber for providing wafers to be loaded into said atmospheric transfer chamber; an integrated particle monitoring tool (910) coupled to said atmospheric transfer chamber; and a CD measurement/integrated thickness tool (906a) coupled to said atmospheric chamber .

26. Fairbairn et al. further teach the use of a controller for controlling the processing modules wherein said controller includes stored instructions for determining the operation of said processing modules depending upon results in said integrated particle monitoring tool or critical dimension monitoring tool (paragraphs 61, 54 and 75 of specification).

Claim Rejections - 35 USC § 103

27. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

28. Claims 19, 24, 45 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino as applied to claims 11-16, 18, 20, 22-23, 44 and 48-49 above, and further in view of U.S. Patent No. 4,816, 098 to Davis et al.

29. Komino disclose the invention substantially as claimed and as described above.

Art Unit: 1763

30. However, Komino fail to teach an integrated particle counter coupled to said atmospheric transfer chamber and a controller for controlling processing based results given by the particle counter.

31. Davis et al. teach the use of particle counters and a complimenting controller in situations where particles are generated by wafers and transfer mechanisms during handling and transport operations for the purpose of measuring the value of particulates present and controlling subsequent processing based on the results (column 5, rows 4-18; column 24, rows 8-22; column 27, rows 23-37; and column 27, rows 66-column 8, rows 7).

32. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a particle counter and a complimenting controller in Komino in order to measure the value of particulates and controlling subsequent processing based on the values as taught by Davis et al.

33. Claims 21, 25, 46 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino as applied to claims 11-16, 18, 20, 22-23, 44 and 48-49 above, and further in view of U.S. Patent No. 6,372,082 to Eriguchi.

34. Komino discloses the invention substantially as claimed and as described above.

35. However, Komino fails to teach an integrated thickness/critical dimension measurement tool coupled to said sub atmospheric transfer module and a controller for controlling the operation of the tool and for controlling the operation of the etch module based on measurements taken by the tool.

36. Eriguchi teaches the use of an critical dimension monitoring/integrated thickness tool with a controller for controlling processing based on the results monitored for the purpose of providing an inexpensive semiconductor device with a layer to be etched having high finish dimension protection (column 4, rows 1-8 and column 8, row 50- column 9, row 7).

37. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a critical dimension monitoring/integrated thickness tool with a controller for controlling processing based on the results monitored in Komino in order to provide an inexpensive

Art Unit: 1763

semiconductor device with a layer to be etched having high finish dimension protection as taught by Eriguchi.

38. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komino and Davis et al. as applied to claims 19, 24, 45 and 50 above, and further in view of U.S. Patent No. 6,372,082 to Eriguchi.

39. However, the prior art fails to teach an integrated thickness/critical dimension measurement tool coupled to said sub atmospheric transfer module and a controller for controlling the operation of the tool and for controlling the operation of the etch module based on measurements taken by the tool.

40. Eriguchi teaches the use of an critical dimension monitoring/integrated thickness tool with a controller for controlling processing based on the results monitored for the purpose of providing an inexpensive semiconductor device with a layer to be etched having high finish dimension protection (column 4, rows 1-8 and column 8, row 50- column 9, row 7).

41. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a critical dimension monitoring/integrated thickness tool with a controller for controlling processing based on the results monitored in the prior art in order to provide an inexpensive semiconductor device with a layer to be etched having high finish dimension protection as taught by Eriguchi.

Conclusion

41. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 703.305.3142. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 703.308.1633. The fax phone numbers for the organization where this

Art Unit: 1763

application or proceeding is assigned are 703.872.9310 for regular communications and 703.872.9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

km
November 30, 2002


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700